

Listing of the Claims:

This listing of claims will replace all prior versions and listings of claims in the application:

1. (currently amended) An expanded olefin resin particle comprising:
a copolymer base resin expanded with ~~and~~ a blowing agent,
the copolymer base resin comprising about 99.95 to 99.999 weight percent of an olefin and about 0.001 to 0.05 weight percent of an α - ω diene, wherein the copolymer base resin has a weight average molecular weight of about 30,000 to 500,000 Daltons, a crystallization temperature of about 115°C to 135°C, ~~and~~ a melt flow rate of about 0.1 dg/min to 100 dg/min as determined using ASTM D-1238 at 230°C and 2.16 kg load, and wherein the expanded olefin resin particle has a particle size capable of passing through a number 2.5 Tyler mesh sieve, but which is retained on a number 30 Tyler mesh sieve.

2. (currently amended) The expanded olefin resin particle of claim 1, wherein the α - ω diene includes 1,6-heptadiene, 1,7-octadiene, 1,8-nonadiene, 1,9-decadiene, 1,10-undecadiene, 1,11-dodecadiene, 1,12-tridecadiene, 1,13-tetradecadiene, 2-methyl-1,9-decadiene, 2-methyl-1,7-octadiene, 3,4-dimethyl-1,6-heptadiene, 4-ethyl-1,7-octadiene, 3-ethyl-4-methyl-5-propyl-1,10-undecadiene, or a combination comprising at least one of the foregoing dienes.

3. (currently amended) The expanded olefin resin particle of claim 1, wherein the copolymer base resin comprises ethylene, propylene, butene-1, pentene-1, hexene-1, heptene-1, 4-methyl-1-pentene, 3-methyl-1-pentene, 4-methyl-1-hexene, 5-methyl-1-hexene, 1-octene, 1-decene, 1-undecene, 1-dodecene, or a combination comprising at least one of the foregoing.

4. (currently amended) The expanded olefin resin particle of claim 1, wherein the copolymer base resin comprises a metallocene-based copolymerization reaction product comprising propylene and one or more α - ω diene monomers.

5. (currently amended) The expanded olefin resin particle of claim 1, wherein a ratio of the weight average molecular weight to the number average molecular weight of the copolymer base resin is about 2 to about 20.

6. (currently amended) The expanded olefin resin particle of claim 1, wherein a ratio of the weight average molecular weight to the number average molecular weight of the copolymer base resin is about 2.5 to about 7.

7. (currently amended) The expanded olefin resin particle of claim 1, wherein the copolymer base resin has a melting point of less than or equal to about 165°C.

8. (currently amended) The expanded olefin resin particle of claim 1, wherein the copolymer base resin has a ratio of extensional viscosity at break to linear viscosity of greater than or equal to about 2.5 at a strain rate from about 0.1 second⁻¹ to about 1.0 second⁻¹.

9. (currently amended) The expanded olefin resin particle of claim 1, ~~which is capable of being foamed into an article to produce a foamed resin article~~ having a bulk density of about 0.001 g/ml to about 0.8 g/ml.

10. (currently amended) The expanded olefin resin particle of claim 1, wherein the copolymer base resin has a branching index g'' of about 0.99 to about 0.6, as determined from the equation:

$$g'' = \frac{[IV]_{\text{branched}}}{[IV]_{\text{linear}}}$$

wherein IV is the intrinsic viscosity of the branched and linear polymers, respectively.

11. (currently amended) The expanded olefin resin particle of claim 10, wherein the branching index g'' is about 0.99 to about 0.93.

12. (currently amended) The expanded olefin resin particle of claim 1, wherein the blowing agent comprises an organic acid, an inorganic acid, a salt of a carbonic acid, or a combination comprising at least one of the foregoing.

13. (currently amended) The expanded olefin resin particle of claim 12, wherein the organic acid comprises citric acid, and wherein the salt of carbonic acid comprises sodium carbonate, sodium bicarbonate, ammonium carbonate, ammonium bicarbonate, potassium carbonate, potassium bicarbonate, or a combination comprising at least one of the foregoing.

14. (currently amended) The expanded olefin resin particle of claim 1, wherein the blowing agent comprises methane, ethane, ethylene, propylene, ethyn, propyne, butane, pentane, hexane, heptane, trichlorofluoromethane, dichlorodifluoromethane, tetrachloroethane, dichlorotetrafluoroethane, methylene chloride, ethyl chloride, nitrogen, oxygen, air, helium, argon, carbon dioxide, water, or a combination comprising at least one of the foregoing.

15. (currently amended) ~~An~~ The expanded olefin resin particle comprising the expanded olefin resin of claim 1, wherein the particle is spherical.

16. (currently amended) A process to produce the ~~an~~-expanded olefin resin particle of claim 1, comprising:

contacting [a] the copolymer base resin with a blowing agent under a pressure greater than or equal to atmospheric pressure,

heating the copolymer base resin and the blowing agent to a temperature greater than or equal to the softening point of the olefin copolymer base resin,

to produce ~~an-expanded~~ the expanded olefin resin particle.

~~wherein copolymer base resin comprises about 99.95 to 99.999 weight percent of an olefin, and about 0.001 to 0.05 weight percent of an α - ω diene, and~~

~~wherein the copolymer base resin has a weight average molecular weight of about 30,000 to 500,000 Daltons, a crystallization temperature in a range from 115°C to 135°C, and a melt flow rate in a range from 0.1 dg/min to 100 dg/min as determined using ASTM D 1238 at 230°C and 2.16 kg load.~~

17. (currently amended) A foamed article comprising a foamed the expanded olefin resin particle of claim 1. ~~wherein prior to foaming, the expanded olefin resin did comprise a copolymer base resin and a blowing agent, wherein the copolymer base resin comprised about 99.95 to 99.999 weight percent of an olefin and about 0.001 to 0.05 wt% of an α - ω diene, wherein the copolymer base resin had a weight average molecular weight of about 30,000 to 500,000 Daltons, a crystallization temperature in a range from 115°C to 135°C, and a melt flow rate in a range from 0.1 dg/min to 100 dg/min, as determined using ASTM D 1238 at 230°C and 2.16 kg load, and wherein the foamed article has a bulk density of about 0.001 g/ml to about 0.8g/ml.~~

18. (currently amended) A process to produce a foamed article ~~comprising a foamed expanded olefin resin of claim 17~~, the process comprising:
heating a plurality of the expanded olefin resin particles of claim 1,
reducing the pressure being applied to the expanded olefin resin particles, or both,
to produce the an expanded foamed article.